Lower Red Cedar River Baseline Monitoring

Fisheries Inventory

by

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Abstract

The Wisconsin Department of Natural Resources (WDNR) water program staff surveyed the lower Red Cedar River during the 1999 and 2000 field seasons as part of the nonwadeable baseline monitoring strategy for Wisconsin's large rivers. A total of seventy species of fish were collected from the lower Red Cedar using a variety of techniques. This is twenty-three more species then were documented during the fish distribution survey in the early 1980's. Five species of fish that were found in the 1980's were not captured during our sampling events. Of those seventy species of fish collected, six are listed on the states endangered, threatened or special concern species list. Index of Biotic Integrity sampling indicates that the lower Red Cedar River fish community is in excellent condition. Species diversity and biomass is high, riverine specialist species are abundant and fish assemblage composition is represented by a diverse and specialized large river fish community.

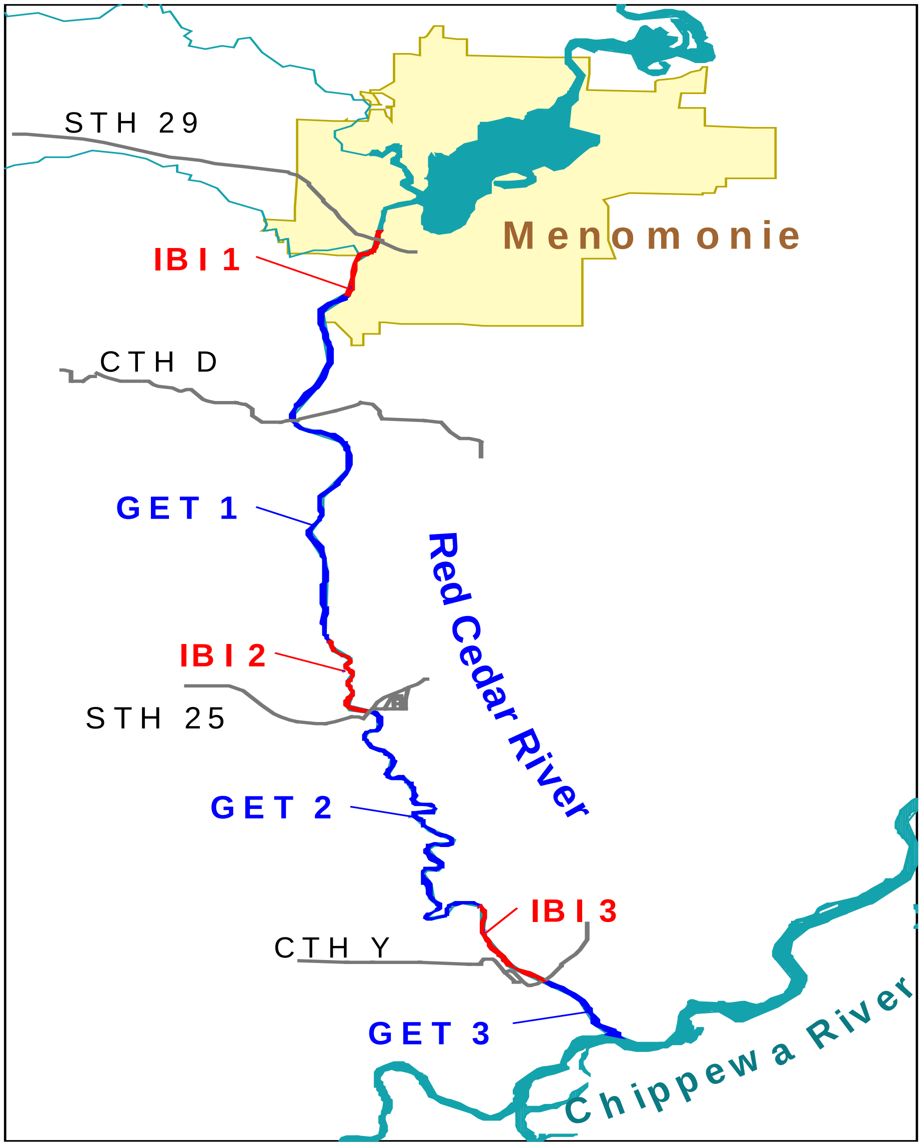
Shorthead redhorse was the most abundant fish captured during IBI sampling runs. During the gamefish and endangered and threatened species runs, smallmouth bass were the most abundant gamefish on the lower Red Cedar River, followed by walleye and channel catfish. The blue sucker (state listed threatened species) were more abundant than walleye during our sampling periods. The blue sucker population on the lower Red Cedar and lower Chippewa Rivers is still likely the last remaining stronghold in the Upper Mississippi River drainage for this species. Other important species such as the black buffalo (state-listed threatened species) and mud darter (state-listed special concern) were recorded from the lower Red Cedar River fish community for the first time. Other endangered or threatened species such as the crystal darter (state listed endangered species), was documented for the first time as far upstream as Menomonie.

Although the river is in excellent shape, we did identify one primary problem and a handful of secondary problems in the fish community. Of utmost importance is the status of the shovelnose sturgeon fishery. Shovelnose sturgeon had been historically documented in high abundance throughout the entire lower Red Cedar River. Historic survey information had shown that it was the most abundant gamefish on the lower Red Cedar River. Our recent survey documented only one shovelnose sturgeon during three seasonal sampling bouts using similar gear, seasonal sampling periods and under similar flow conditions. At this time, it appears that the shovelnose sturgeon fishery on the lower Red Cedar River has nearly collapsed. Future studies and regulation evaluations are needed to address this high priority issue. Other secondary issues that should be addressed is gamefish relative abundance. When comparing smallmouth bass abundance to the St. Croix River in western Wisconsin it appears that smallmouth bass recruitment is lower. Also witnessed were cases of fish stranding on the lower Red Cedar from hydro-operations. Although not a focus of this study, hydro-operations should be thoroughly evaluated during the FERC re-licensing process for all species of fish on the lower Red Cedar River and measures that will avoid and minimize impacts should be pursued.

Overall, the lower Red Cedar River fish community is in very good condition. This can be attributed to the fact that the lower Chippewa and lower Red Cedar Rivers have not been fragmented by dams and near shore habitat degradation has been minimized. Fish access is not impeded from the larger Chippewa and Mississippi Rivers, thereby providing a large free-flowing riverine system with suitable habitat in which the large river fish community in the lower Red Cedar River needs to survive.

Future management activities should target efforts in which to avoid and minimize habitat losses associated from various sources. Habitat losses can range from such impacts as water level fluctuations, fish passage obstruction from dams, fragmentation and destruction of riverine shoreline habitat from landuse changes, near shore habitat losses from development pressures and deterioration of water quality conditions in the watershed. In efforts to maintain the biological integrity of the lower Red Cedar River all these factors must be taken into consideration and be of equitable importance if the preservation of this river and its associated biological community are to be preserved for future generations.

Figure 1: Sampling sites and stations on the lower Red Cedar River



Sampling Dates:	**July 12, 21, 22 - 1999** **Sept 27, 28, 29 - 1999** **May 8, 9, 10th - 2000**
Field Crew:	**Marty Engel, Brian Spangler, Dean Johnson, Heath Benike, Joseph Kurz, Brian Brecka, Angela Parkhurst, Holly Eaton, John Paddock, James Holzer, Ken Schreiber, Tom Aartila, Scott Peavy, Patty Asher, Shaun Tysnik, BJ Michalek, Mike Volgesang, Scott Toshner and Jim Krietlow.**
Data Management:	**Heath Benike, Amanda Rabuck and BJ Michalek.**

INTRODUCTION

As part of the baseline monitoring strategy for non-wadeable rivers in Wisconsin, the Wisconsin Department of Natural Resources, lower Chippewa River Basin water staff and Mississippi River fisheries work unit together sampled the lower Red Cedar River during the 1999 and 2000 field seasons. The purpose of this survey was to develop a baseline inventory of the existing fisheries resources in the lower Red Cedar River and make recommendations for future fisheries management activities. In addition, the work that was conducted will be used to develop standardized methods and procedures for monitoring non-wadeable rivers in the West Central Region and throughout the state of Wisconsin.

PHYSICAL DESCRIPTION

The lower Red Cedar River starts below the Menomonie hydropower facility (Federal Energy Regulatory Commission (FERC) project # 2181) and is free flowing for approximately 17.5 miles before it joins the Chippewa River near the unincorporated village known as Dunnville. The hydropower facility affects current flow conditions in the lower Red Cedar River. The current FERC license requires that a constant minimum flow of 450 cubic feet per second be released from the hydroplant at all times. Mean annual discharge at Menomonie is estimated at 1,300 cubic feet per second (USGS, 1999). The riparian corridor is primarily wooded and well protected. Development pressure has historically been low, but is increasing with the rapid growth currently experienced in Western Wisconsin. The physical nature of the lower Red Cedar River changes dramatically. From Menomonie to approximately one upstream of Downsville the river is wide, relatively straight, has little active bank erosion, overhead cover is scarce and has numerous large bedrock runs. From approximately one mile upstream of Downsville to the mouth the river is much narrower, has more meanders, ample overhead cover, active bank erosion and no large bedrock runs are present.

METHODS

Three stations were established on the lower Red Cedar River (Figure 1). Each station was divided into two sampling reaches. Each sampling station consisted of a one-mile index of biotic integrity run (IBI) and a longer gamefish and endangered and threatened resources run (GET). Sampling was conducted in mid-July, late-September and mid-May, when water temperatures were above 59 degrees F.

Within the one-mile (IBI) station the following sampling techniques were used:

A. **Large Rivers IBI**: Fish were collected using two pulsed-DC mini-boomshockers during daylight hours. Shocking proceeded downstream with one boat per shoreline operating at approximately 400 volts and 14 amps. The catch and effort was kept separately for each individual boat. Boat operators were instructed to follow the shoreline for a distance of one mile. Dipnetters were instructed to collect fish greater than two inches in length. Species were identified and individual length and weight information was recorded from all fish captured within the one-mile IBI run. Due to the large numbers and biomass of fish collected (mainly non-game fish), several processing stops were made within the one-mile IBI run. Any fish that was not identifiable in the field was preserved in a 10% formalin solution for later identification purposes.

B. **Small Fish Assemblage** *(SFA)*

1. **Mini Stream Shocker**: Fish were collected using a DC-mini streamshocker with three electrodes within the one-mile IBI station operating at approximately 250 volts and 4 amps. Shocking proceeded upstream for approximately 3300-5280 feet from the end of the one-mile IBI station. Accessibility and depth were the determining factors to which side of the stream was sampled, however an attempt was made to sample diverse habitat sites. Effort was recorded in minutes. All fish collected were identified by species and counted. Any fish that was not identifiable in the field was preserved in a 10% formalin solution for later identification purposes.

2. **Shoreline Seining**: Three fifty-foot seine hauls were sampled at three sites within the one-mile IBI station. Seine haul sites were selected according to various habitat features within the one-mile IBI station. Catch per individual seine haul was kept separate. All individual fish were identified, counted and recorded. Any fish that was not identifiable in the field was preserved in a 10% formalin solution for later identification purposes.

C. Gamefish and Endangered and Threatened Species Run (GET): Fish were collected using two pulsed-DC mini-boomshockers operating at approximately 400 volts and 14 amps. Shocking proceeded downstream with one boat covering each shoreline. The catch and effort (minutes) for each boat was recorded separately. Boat operators were instructed to follow the shoreline for entire GET run, but they could "work" cover where appropriate. Dipnetters were instructed to collect all gamefish, endangered and threatened species. Bluegill, crappie, yellow perch and white bass were not collected during this run. In addition, if a nongame fish was observed that had not been collected during other sampling events or methods it was captured once to document its presence on the river (ex. Longnose gar).

DISCUSSION

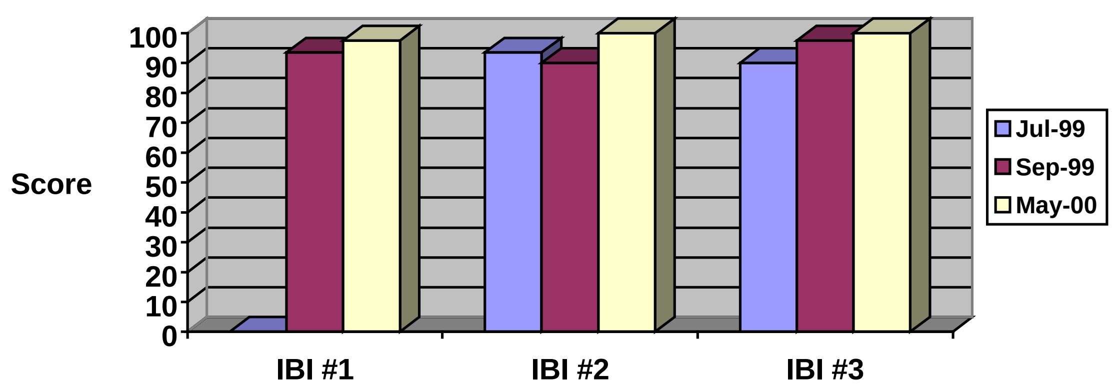
LARGE RIVERS IBI

An index of biotic integrity (IBI) for large river systems was recently developed for Wisconsin's nonwadeable rivers, which is yet to be published (currently in review in the Transactions of the American Fisheries Society). The large rivers IBI is intended to give resource managers a general condition of the fish community and the overall health of a particular river system. The IBI is a tool that resource managers can use to develop trends to judge whether a particular system is improving, declining or remaining stable. It may also be used to compare large river systems within a local geographic region.

Mean large rivers IBI scores were calculated for all stations (except the July sample at Station #1 due to a data recording error) on the lower Red Cedar during the three seasonal sampling bouts (Figure 2). Mean scores ranged between 90-100 which indicates that the overall health of the lower Red Cedar River fish community is in excellent condition. This can be expected, due to the diverse and unique fish community. The lower Red Cedar River, as well as the lower Chippewa River, represent some of the last remaining unimpounded large river habitat in the upper Mississippi River drainage. A major reason for the diverse fish fauna is likely due to the fact that dams have not fragmented, flooded or eliminated fish access to this important large river system and its associated habitats. Studies have shown that dam construction can negatively impact the native fish communities (Winston and Taylor,1991) (DeJalon, Sanchez and Camargo, 1994) (Bonner and Wilde, 2000). If dams were to be constructed or if any barriers to fish migration were provided it is very likely that the health of the native lower Red Cedar fish community would be in serious jeopardy. Another primary reason for the diverse fish community is that near shore habitat development and fragmentation has been minimized along the riparian corridor. Currently most of the riparian corridor is undeveloped and is essentially wild land that consists of a mixture of floodplain forest, upland hardwoods and small escarpments. If the existing land use changes along the river corridor and near shore habitat becomes fragmented and degraded, it is very likely that the health of the lower Red Cedar River fish community could be adversely impacted.

Two species that were not previously recorded in the lower Red Cedar River were collected in the May 2000 sample. The state listed threatened species the black buffalo was collected near Downsville and the spotted sucker was collected near Dunville. These two species have never been recorded in the lower Red Cedar River (Fago, 1984). It is apparent that these two species may be making spring spawning runs likely out of the larger Mississippi River system and then are absent from the study area during the remainder of the year. This can be further validated because during concurrent sampling on the lower St. Croix River these two species were also collected during the May 2000 sampling period and were absent from the July 1999 and September 1999 sampling periods.

Figure #2: Mean Large Rivers IBI Scores for the Lower Red Cedar River

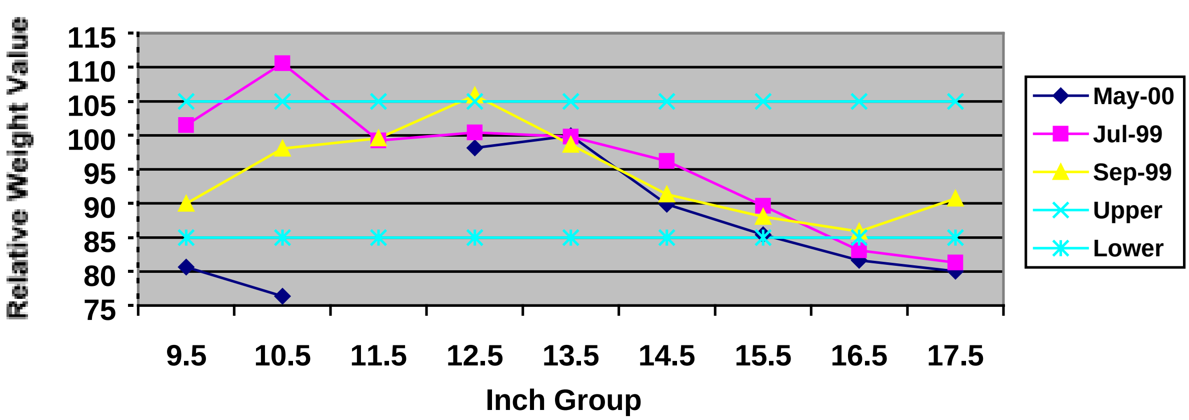


The most abundant fish collected during the IBI sampling runs were shorthead redhorse and the most abundant gamefish collected was smallmouth bass. A total species list that was collected during the IBI runs is provided in Appendix A.

Relative Weight Measure

Relative weight is one of several condition indices used to access the general health of fishes. Proposed relative weight equations and standard lengths were proposed for larger river fishes (Bister etal, 2000). Relative weight metrics were calculated for shorthead redhorse on the lower Red Cedar River during all three sampling periods. Relative weight measures were within the normal range for size ranges between 12.5 and 15.5 inch group (Figure 3). Larger shorthead redhorse fell below the normal range for the 16.5 and 17.5 inch group in the July and May sample, but were within the normal range in the September sample. In addition the data shows that as shorthead redhorse are reaching larger size ranges, their relative weights are getting poorer. May relative weight metrics were lowest for all sizes ranges except the 13.5 inch group. This is somewhat odd considering that these fish should be in fit condition in preparation for spawning activities that would occur in mid-May, but this was not the case.

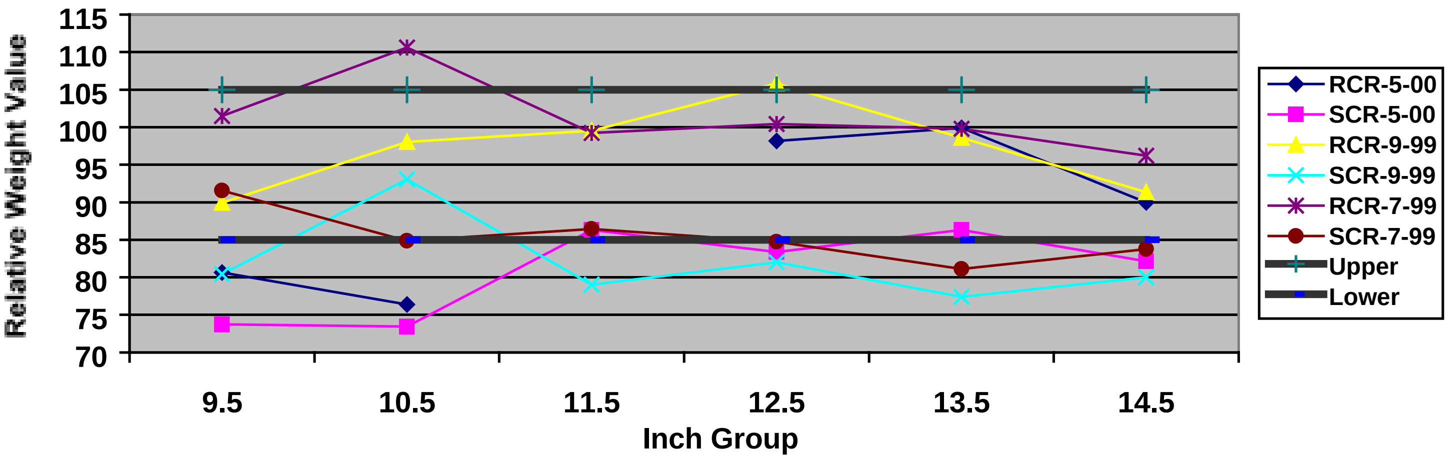
Figure 3: Shorthead Redhorse Relative Weight, Lower Red Cedar River



Comparison of Relative Weight Values with the lower St. Croix River.

When comparing the lower St. Croix River to the lower Red Cedar River, relative weight values are higher on the lower Red Cedar River for shorthead redhorse between 9 and 15 inches (Figure 4). The non-game fish community on the lower Red Cedar River appears to be in better condition when compared to the lower St. Croix River.

Figure 4: Realtive Weight Values. Lower Red Cedar vs Lower St. Croix River

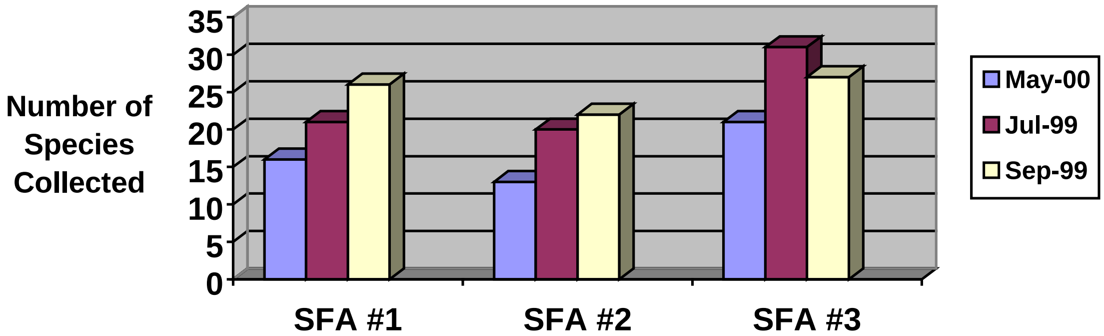


Small Fish Assemblage (SFA)

Shoreline Stream Shocking

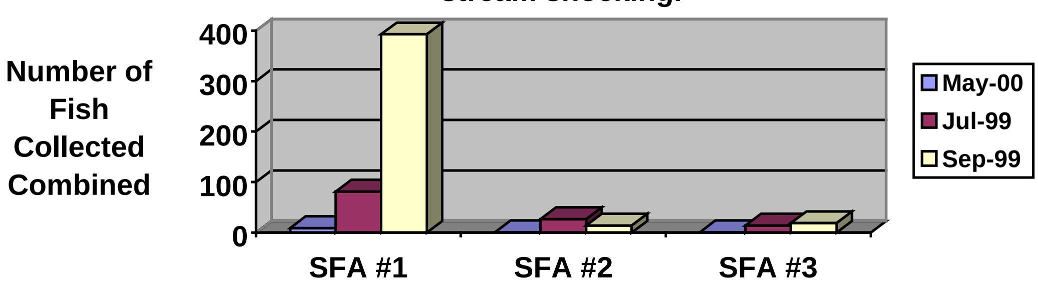
Species diversity was greatest at SFA station #3 during all sampling bouts (Figure 5). This can likely be attributed to the proximity of the lower Chippewa River, which is located about one mile from this sampling station. Species diversity was also lowest during the May sampling period at all three stations. The most likely causes of this decrease could be that either small fish were not occupying the shallow water margins due to lower water temperatures, or that possible spring run-off and overwinter mortality may have reduce species abundance or, the fish were simply not present due to seasonal movements. A list of the total species catch is provided in Appendix A. Shoreline shocking proved to be a valuable component that allowed us to document the presence, absence and distribution of various game and non-gamefish members of the fish community.

Figure 5: Species Diversity - Red Cedar River, Stream Shocking



Fish assemblages at SFA # 1, which is located .5 miles downstream of the Menomonie hydroplant had higher catch rates of young of the year centrachids such as bluegill and black crappie when compared to sites farther downstream (Figure 6). The large number of young centrachids found at station #1 are likely caused by fish entrainment through the hydroplant from Lake Menomin. This is consistent with a recent entrainment study that was conducted at Lake Wissota on the Chippewa River (GLEC, 2000). The Wissota entrainment study documented that high numbers of young of the year bluegill and black crappie were entrained during the months of August and September. The data collected at SFA #1 shows this same trend.

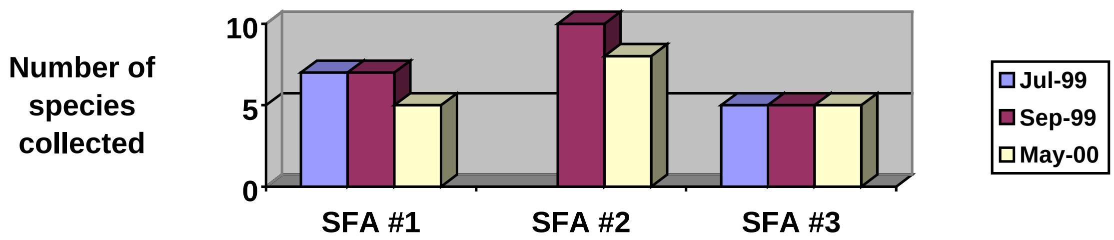
Figure 6: Bluegill and black crappie collected during stream shocking.



Shoreline Seining

Shoreline seining was conducted during the three sampling periods (Figure 7). Species abundance was much lower when using shoreline seining when compared to ministream shocking. In addition many of the species caught during seining were usually common fish community members and no unique or rare species were captured during the seining process. A total list of species captured can be found in Appendix A.

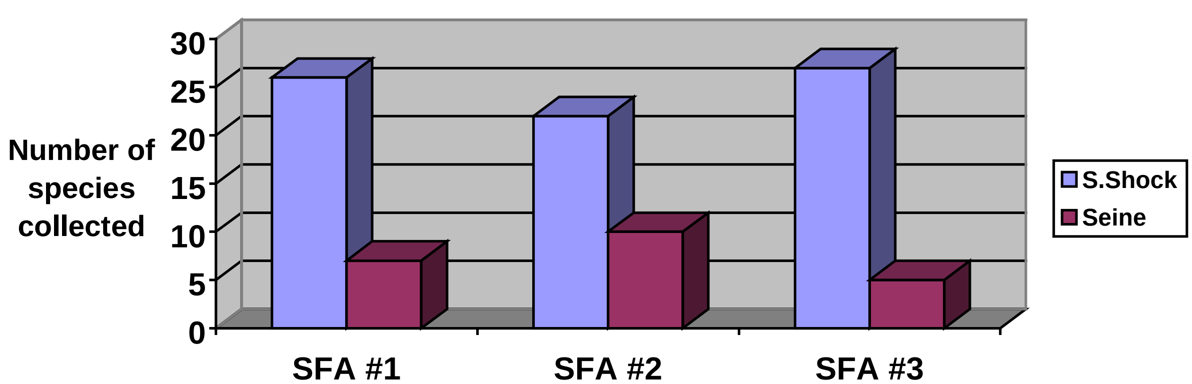
Figure 7: Species Diversity, Shoreline Seining, lower Red Cedar River



When comparing shoreline stream shocking with shoreline seining, species diversity was substantially higher using the shoreline shocking method (Figure 8). In addition, the number of darter species collected during the stream shocking was much higher when compared to shoreline seining. This data confirms that shoreline shocking is a more effective technique for measuring species presence and absence, as well as providing a more representative sample on the fish community assemblage. A total species list is provided in Appendix A.

Many of the species that were documented during shoreline shocking were not found during the 1984 fish distribution survey (Fago, 1984). The main difference between the two surveys was that during the fish distribution survey shoreline shocking was not used as a sampling technique on the lower Red Cedar River. This fact alone justifies the need to use a similar shoreline sampling method on all large rivers in Wisconsin to better document species presence and absence.

Figure 8: Species Diversity Shoreline Shocking vs Seining, Sept-99 lower Red Cedar River

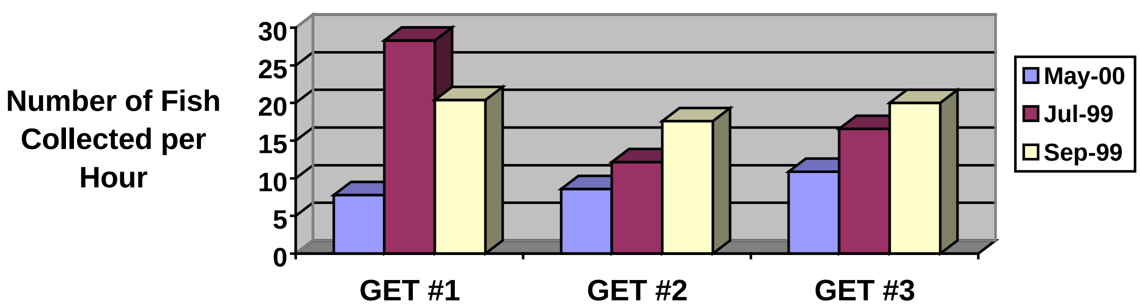


Gamefish and Endangered and Threatened Species Runs *(GET)*

SMALLMOUTH BASS

Smallmouth bass were the most abundant gamefish collected in the lower Red Cedar River. Overall, catch per hour was lowest during the May sampling period (Figure 9) at all stations. The highest catch rate of smallmouth bass was 28.3 fish per hour in July at GET station #1. It also appears from this data that catch rates increased during the

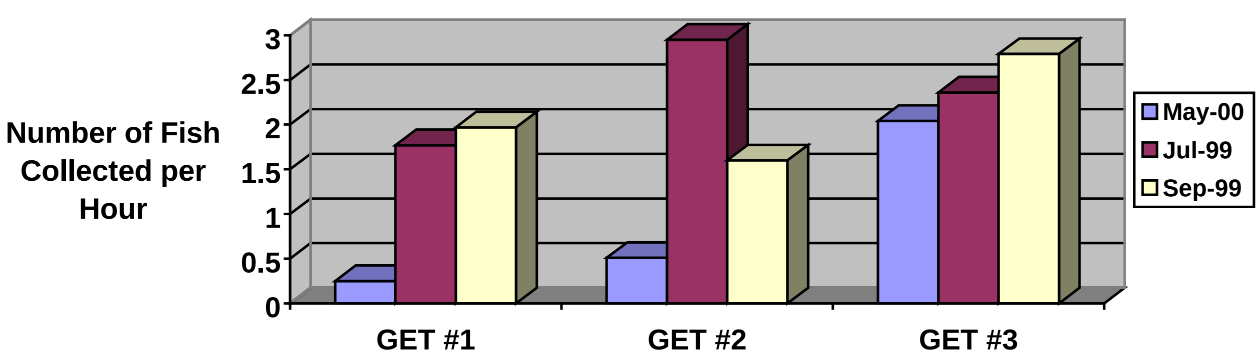
Figure 9: Smallmouth Bass (CPUE/HR) All Sizes



September sampling period. More fish recruiting into larger size ranges, which would make them more susceptible to capture considering our sampling technique, could cause this. Another possible factor for an increase in catch rates could be related to seasonal movement patterns. Excluding GET station #1, GET station #2 and GET station #3 had the highest catch rates during the September sampling period and showed a steady increase in abundance on a seasonal basis.

When comparing legal sized smallmouth bass (> 14 inches), catch rates were lowest at all stations during the May sampling period (Figure 10). September CPUE rates were higher at all stations when compared to the May sampling period and catch rates at GET station #1 and GET station # 3 were highest during the September sampling period.

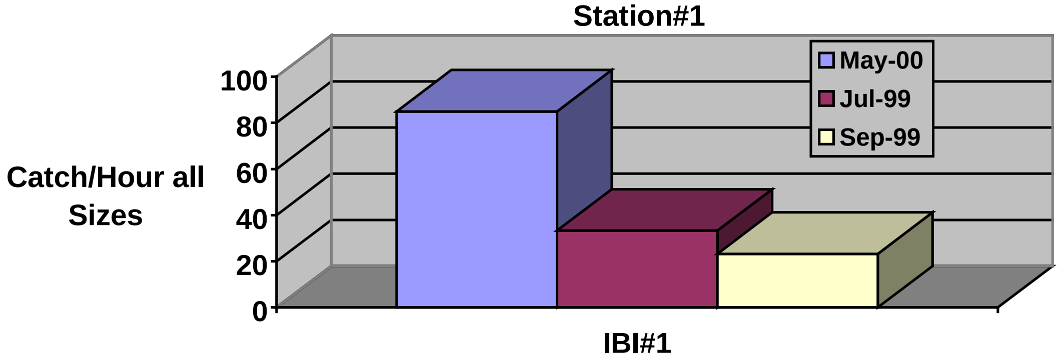
Figure 10: Smallmouth Bass (CPUE/HR) > 14 inches



One possible reason for the low number of smallmouth bass (>14 inches) in the May sample may be related to a migratory patterns. On the Embarrass, Wolf and Upper St. Croix Rivers in Northern Wisconsin smallmouth bass were shown to move large distances to overwintering habitat and return to summer ranges during mid-May when water temperatures were near 59 degrees F (Langhurst and Schonecke, 1990) (Dammen, 1996). In addition, smallmouth bass on the lower Black River have been shown to move into the larger Mississippi River system seeking overwintering habitat (Endris, personal comm.) Published water temperatures indicate that most smallmouth bass are at their summer home range when water temperatures are at 60 degrees F. During the May sampling period water temperatures were recorded at 63 degrees F. Therefore according to published literature smallmouth bass should have been occupying traditional summer home ranges and should have been much more abundant during the May sampling period, but that was not the case. Therefore other factors should be taken into consideration.

Looking at the data in more detail, the large pool within IBI station #1 near highway 29, which is outside of the GET station #1 and therefore the catch rates did not count for GET station #1, had a high concentration of smallmouth bass during the May sampling period. When comparing seasonal catch rates at IBI station #1 it is obvious that smallmouth numbers were substantially higher in the May sample indicating that this area is important overwintering area or staging area for smallmouth bass spawning activities (Figure 11).

Figure 11: Smallmouth Bass Relative Abundance at IBI Station#1

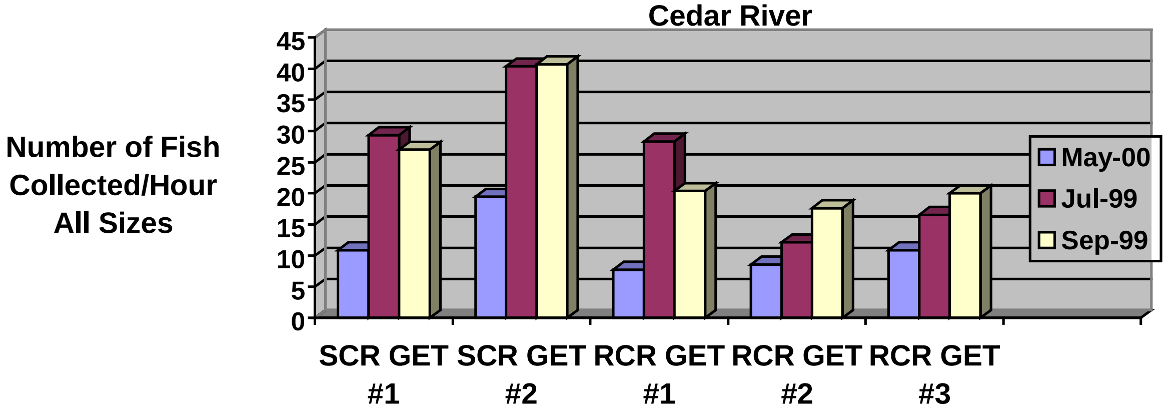


Future management should take this into consideration. Impacts from a year round angling season should be evaluated knowing that this area is an important wintering area and or staging area for smallmouth bass. Anglers typically target this area in the springtime when species such as walleye and sauger are making spawning movements. The proximity of the dam, which acts as an upstream fish barrier and the fact that the only public access point of the river is located in this reach, should be carefully evaluated.   Another factor that should be taken into consideration is any impacts from hydropower generation on smallmouth bass spawning activities and fry development. Water level fluctuations due to the proximity of the hydroplant would be most pronounced in this stretch of the lower Red Cedar River. Efforts to avoid and minimize possible hydrogeneration impacts during spring time spawning and late spring-early summer fry development period should be pursued.

Comparison of Relative Abundance with the lower St. Croix River.

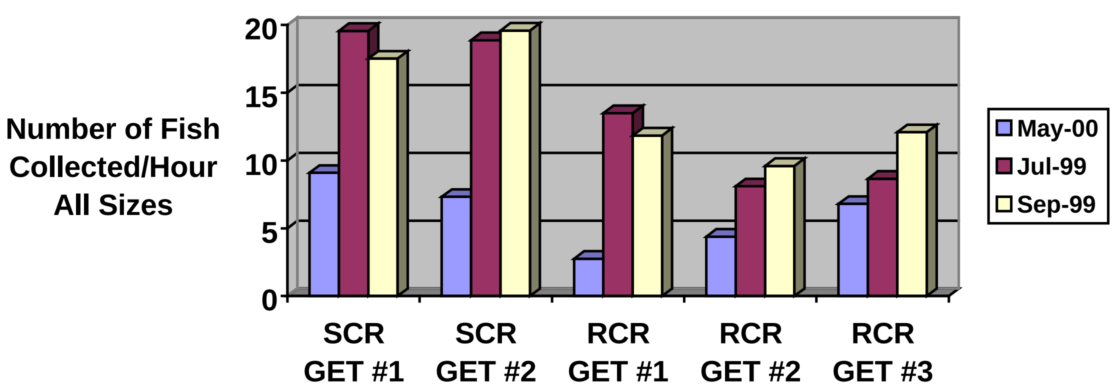
When comparing catch rates between the lower Red Cedar River with the lower St. Croix River in western Wisconsin, the relative abundance of smallmouth bass is lower on the lower Red Cedar River (Figure 12) at GET stations #2 and #3 and lower or equal (depending on seasonal sampling period) to the St. Croix at GET station #1.

Figure 12A: Smallmouth Bass (CPUE) lower St. Croix vs lower Red Cedar River



Possible impacts from hydropower peaking operations on the lower Red Cedar may be a factor. Studies conducted by (Cushman, 1985) (Moog 1993) documented the effects of peaking operations on riverine species. Juvenile smallmouth bass relative abundance for fish less than 8 inches is lower on the lower Red Cedar when compared to the lower St. Croix (Figure 12B).

Figure 12B: Smallmouth Bass (CPUE/HR) < 8 inches



Juvenile smallmouth bass are shallow slow species. The lower Red Cedar River is confined to a much narrower chute-like river channel with numerous large riffles and runs, when compared to the lower St. Croix River which is more broad and has less of these types of habitat features. This narrow chute-like river channel on the lower Red Cedar River likely provides less opportunities for refuge when compared to the lower St. Croix. In addition there are minimal backwater and side channel complexes on the lower Red Cedar River when compared to the lower St. Croix River. The lower St. Croix River has a mosaic of side channels, cut-off sloughs and habitats conditions in which smallmouth bass fry and young could likely seek refuge more freely when compared to the lower Red Cedar River.

MORTALITY ESITMATES

Catch curves were developed for smallmouth bass on the lower Red Cedar River (figure 13,14 and Table 1). Total annual mortality was estimated at 40% during the July sample for ages 1 to 8, (R squared = .90). Estimated total annual mortality for the September sample was 51% for ages 2 to 9 (R squared=.95). The rationale for comparing age 1 to age 8 fish with age 2 to 9 fish is because during the July sample all fish were backcalulated to the beginning of the growth year, whereas the September sample of smallmouth bass were considered to be done growing for that year. More specifically, they are the same year classes of smallmouth bass, but they were aged differently due to seasonal sampling problems.

Mortality estimates for the May sample were much higher when compared to the July and September sample. Possible explanations could be due to overwinter mortality or possibly due to a smaller sample size of adult smallmouth bass in the May sample as indicated in the previous discussion.

Figure 13: Catch Curve; Smallmouth Bass-July 1999 Sample, lower Red Cedar River, Ages 1 to 8.

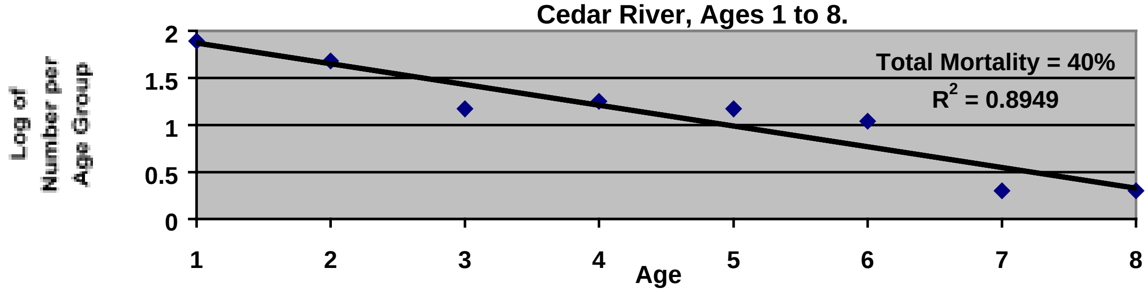


Figure 14: Catch Curve; Smallmouth Bass-September 1999 Sample lower Red Cedar, Ages 2 to 9.

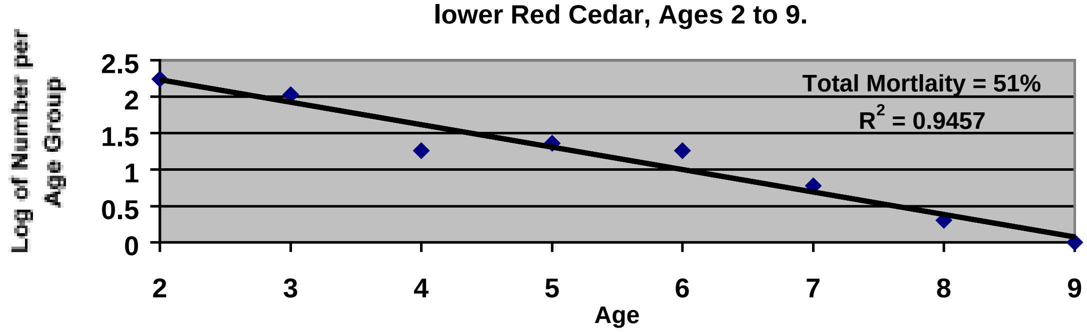


Table 1: Lower Red Cedar River-Estimated Annual Mortality Rates-Smallmouth Bass

Month	Year	Age Range	Annual Mortality	R-Squared
July	1999	1-8	40%	0.90
		2-8	40%	0.85
		3-8	38%	0.77
		4-8	47%	0.86
		5-8	53%	0.86
Sept	1999	2-8	50%	0.92
		2-9	51%	0.95
		3-8	49%	0.87
		3-9	51%	0.92
		4-8	44%	0.77
		4-9	48%	0.87
		5-8	57%	0.94
May	2000	2-8	51%	0.93
		3-8	55%	0.92
		4-8	62%	0.99
		5-8	65%	0.99

Growth Rates

Growth rates were calculated for the lower Red Cedar River during all sampling events. Fish were backcalculated to the beginning of the 1999 growing season using standard a values (Carlander, 1982) during the July sample. Fish that were captured during the September sampling period were considered to be done growing for the 1999 season and fish collected during the May sample were collected before growth during the 2000 season occurred.

Figure 15 shows that growth rates were faster on the lower Red Cedar for age 1, 2 and 3-year-old fish when compared to the statewide average (WDNR, FMRB). For ages 4 and 5 growth rates are equal to or slightly below the statewide average. When comparing smallmouth growth rates with the statewide average, it appears that growth is faster for ages 1, 2, and 3-year-old fish, average at age 4 and then falls below the statewide average for ages 5 through 9 (Figure 15).

The 1996 year class of smallmouth bass also appears to be very week when looking at the July and September samples (Table 2). This will provide less recruitment of legal sized smallmouth bass in the lower Red Cedar for 2001-2002 angling seasons.

Figure 15: Mean Length at Age. Smallmouth Bass, lower Red Cedar River

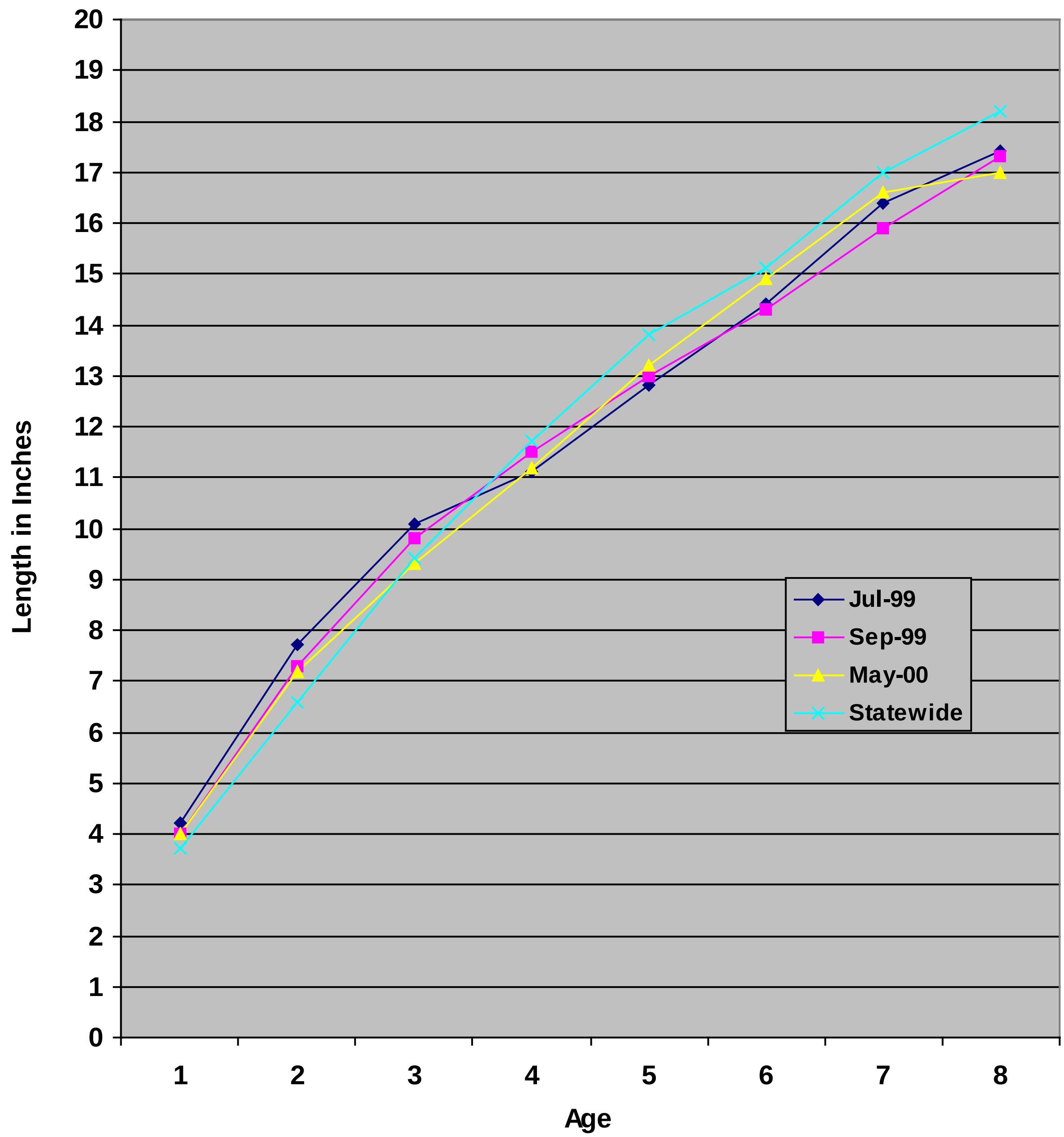


Table 2: Seasonal Mean Length at Age smallmouth bass, lower Red Cedar River

Mean Length at Age July-99

Year Class	Age	# Aged	SD	Mean Length
1998	1	78	.57	4.2
1997	2	48	.84	7.7
1996	3	15	1.39	10.1
1995	4	18	1.38	11.1
1994	5	15	1.16	12.8
1993	6	11	.81	14.4
1992	7	2	.41	16.4
1991	8	2	1.69	17.4

Mean Length at Age Septmeber-99

Year Class	Age	# Aged	SD	Mean Length
1999	1	16	.5	4.0
1998	2	172	.8	7.3
1997	3	106	.6	9.8
1996	4	18	.3	11.5
1995	5	23	.7	13
1994	6	18	.2	14.3
1993	7	6	.4	15.9
1992	8	2	.3	17.3
1991	9	1	N/A	18.0

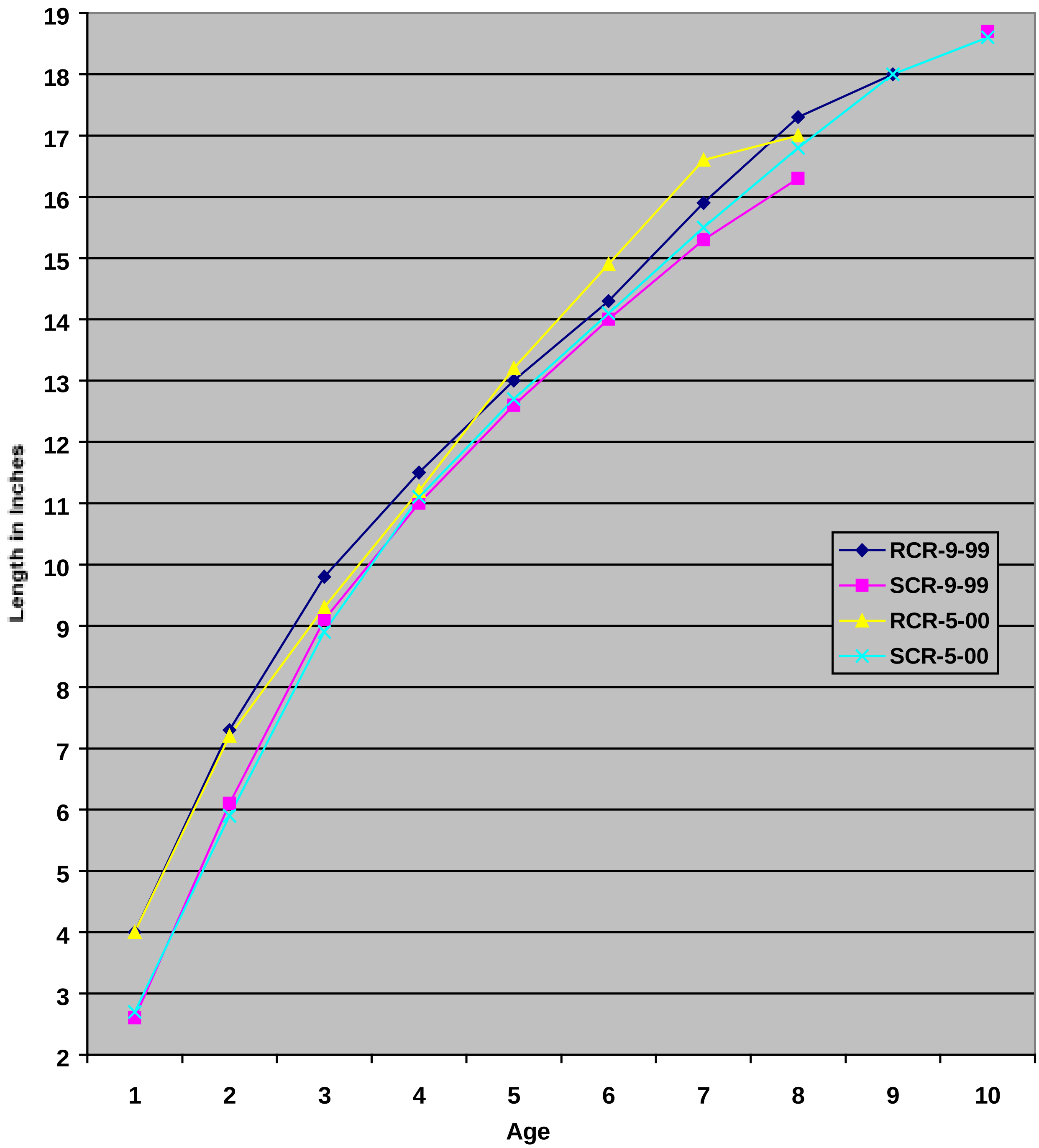
Mean Length at Age May-00

Year Class	Age	# Aged	SD	Mean Length
1999	1	8	.32	4.0
1998	2	85	.66	7.2
1997	3	40	.62	9.3
1996	4	48	.67	11.2
1995	5	22	.55	13.2
1994	6	10	.69	14.9
1993	7	3	.23	16.6
1992	8	1	n/a	17.0

Comparison of Smallmouth Bass Growth Rates with the lower St. Croix River.

When comparing growth rates between the lower St. Croix River and the lower Red Cedar River in Western Wisconsin it appears the growth rates on the lower Red Cedar are higher when compared to the lower St. Croix (Figure 16).

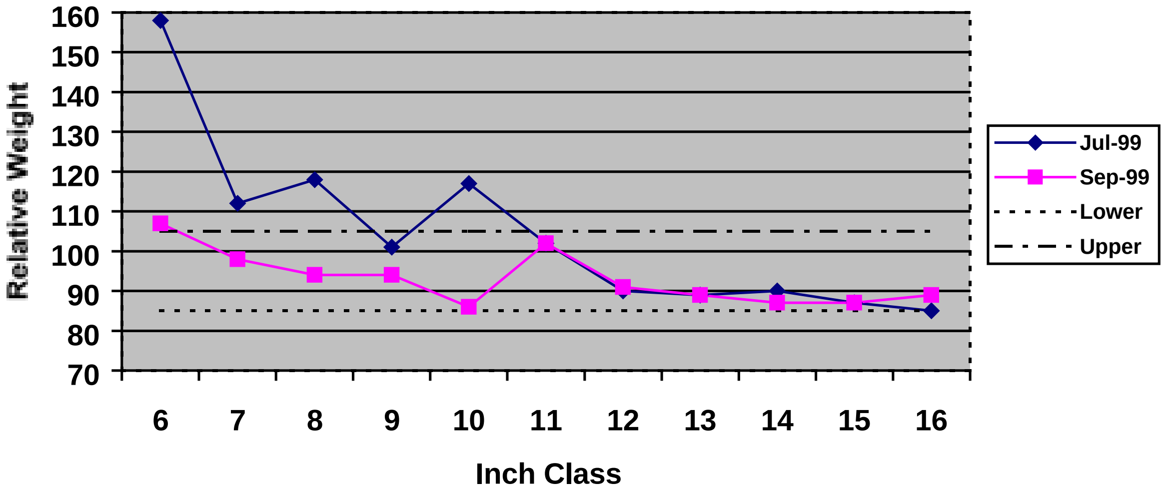
Figure 16: Mean Age and Growth Comparison, lower St. Croix vs lower Red Cedar River



Relative Weight

Relative weight metrics were calculated for the July and September sampling periods for fish between 6 and 16 inches (Figure 17). May relative weights were not calculated due

Figure 17: Smallmouth Bass Relative Weight, Lower Red Cedar River



to a much smaller sample size. Relative weight values were higher during the July sampling bout. Smallmouth bass between 6-10 inches appear to be in poorer condition in September when compared to July. This would be the exact opposite of what you would expect to occur. It would be logical for smallmouth bass to be at optimal fitness before the long winter months of relative inactivity, but this is not the case. For fish in the 11-16 inch range relative weight values were very similar and did not vary.

Smallmouth Bass Overall

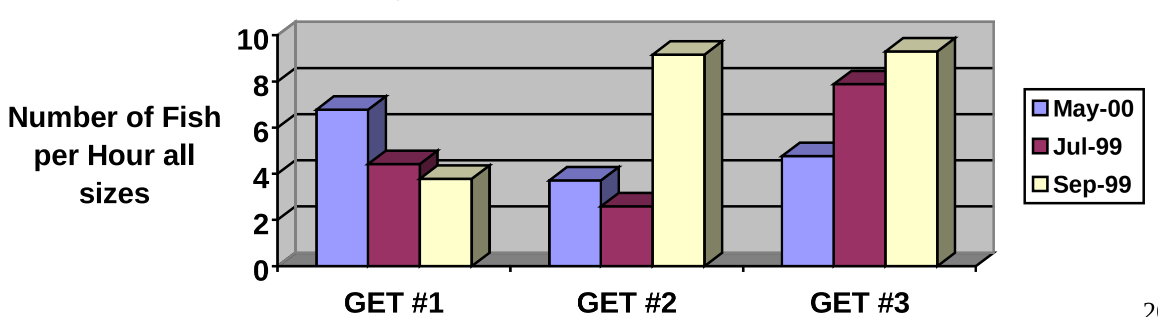
From the above data there is likely a recruitment problem on the lower Red Cedar River. Abundance of smallmouth bass less than 8.0 inches was much lower on the lower Red Cedar River than the lower St. Croix River. In addition, growth rates on the lower Red Cedar appear not to be a limiting factor when compared to the lower St. Croix and estimated mortality are relatively similar between the two river systems. Factors that could be influencing recruitment may be related to habitat conditions for smallmouth bass during spawning and fry development from artificial water level fluctuations caused by hydro-operations. Recent studies have shown (Bowen 1998), that hydropower peaking reduced the amount of time that shallow-water habitat persisted and also indicated that mean fish density was positively correlated with the persistence of shallow water and slow water habitat. (Travenich et al, 1995) documented that artificial fluctuations in stream flow caused by hydroelectric generation can degrade fish habitat and reduce the abundance and diversity of riverine fish fauna. More recently, an instream flow study that was conducted on the lower Chippewa River (Klienschmidt , 1998) documented that habitat conditions for smallmouth bass fry were negatively impacted by large changes in river flow.

Another possible reason for lower abundance of age 1 and 2 smallmouth may be related to poor water quality conditions. The lower Red Cedar is listed as an impaired water under the EPA 303d listing for pH violations and eutrophication. Water Quality conditions could possibly be limiting the abundance and recruitment of smallmouth bass. Habitat conditions on the lower Red Cedar at GET station #1 lacks woody-debris. Little if any snag habitat is found in this section of river. There are reasons for the limited snag habitat. Lake Menomin and Tainter Lake complexes greatly reduce any downstream woody-debris transfer. Another likely problem that is limiting woody-debris transport is the fact the channel from Menomonie to about 1.5 miles upstream of Downsville has little active bank erosion. Certain sections of river in this reach are armored in bedrock and the banks are relatively stable, which does not allow much for active woody debris input. The lack of woody debris changes substantially from Downsville to the mouth of the Red Cedar, but smallmouth abundance does not improve. Overhead cover from snags is very abundant in the stretch of river from Downsville to the mouth and catch rates in these sections did not increase to any large degree. Therefore, it is unlikely that the lack of woody debris is limiting smallmouth abundance riverwide. One thing that should be noted is that catch rates substantially increased whenever a rip-rap shoreline was sampled. Numerous age classes were collected and many of the larger adult fish were captured near rip-rap shorelines. Habitat conditions could be enhanced by stabilizing site-selective eroding river banks, especially in the section downstream from Downsville. Incorporating large boulders and or cover rocks to select mid-channel feeding areas could also enhance smallmouth bass habitat in the lower Red Cedar River especially in GET station #1.

WALLEYE

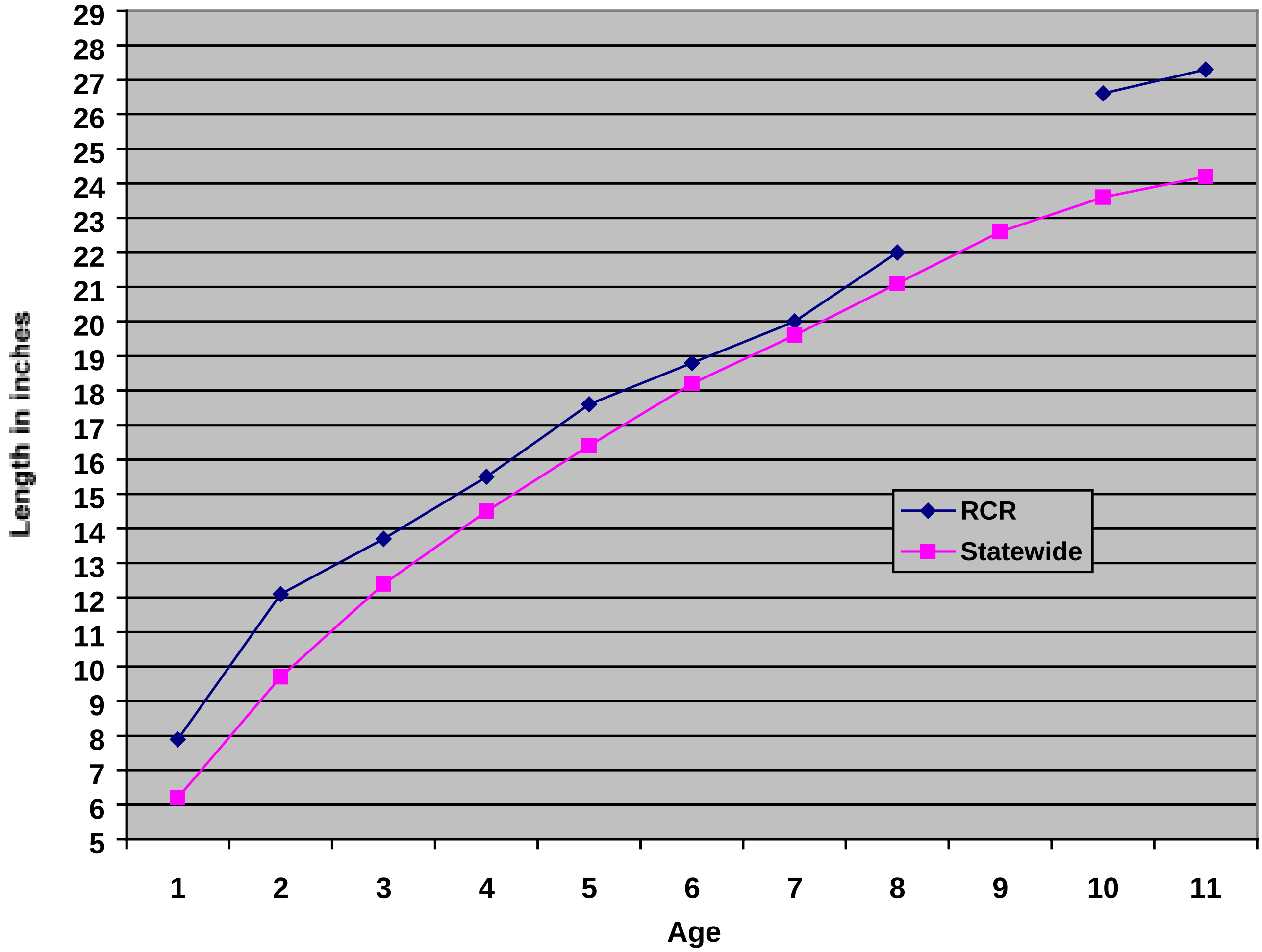
Walleye catch per unit of effort ranged from a high of 9.3 fish per hour at GET station # 3 in September to a low of 2.6 fish per hour at GET station #2 in July (Figure 18). Catch rates were higher at GET station #3 during the July and September sampling, but highest at GET station #1 during the May sampling period. It also appears from this data that there is seasonal movement on the lower Red Cedar River. GET station #1 had the highest catch rates in May, presumably an upstream migration from the spring spawning season, but decreased throughout the year during the July and September sampling event. In comparison, GET station #3 appeared to have an increase in catch rates during the July and September sampling events, possibly indicative of a gradual downstream movement during the summer and fall.

Figure 18: Walleye (CPUE/HR) All Sizes



Walleye scales were backcalculated using standard A values (Carlander, 1982) for the July and September 1999 sampling bouts and aged assuming no growth had occurred during the May sampling bout.

Figure 19: Walleye Backcalculated Mean Length at Age, lower Red Cedar River July and September 1999 combined



Walleye growth rates on the lower Red Cedar River are higher than the statewide average for all ages classes (Figure 19). In addition, it appears that Walleye are reaching the minimum size limit of 15 inches near the end of the third and during the fourth year of growth.

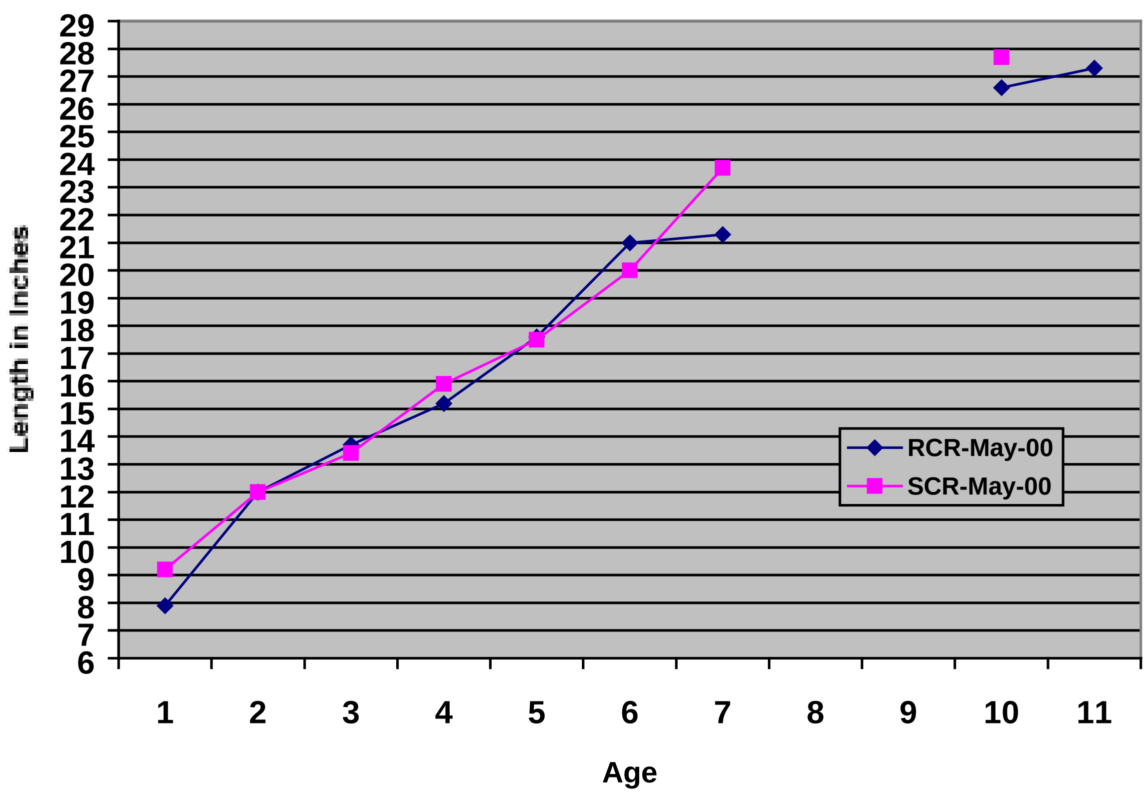
Table 3: Backcalculated mean length at age walleye, lower Red Cedar River, July and Sept 1999.

Year Class	Age	# Aged	Mean Length	SD
1998	1	82	7.9	1.1
1997	2	36	12.1	0.8
1996	3	6	13.7	0.6
1995	4	1	15.5	0
1994	5	3	17.6	0.2
1993	6	3	18.8	0.5
1992	7	1	20.0	0
1991	8	2	22.0	2.3
1990	9	0	0	0
1989	10	1	26.6	0
1988	11	1	27.3	0

Comparison of walleye growth between the lower Red Cedar and lower St. Croix.

We compared May 2000 aging data collected from the lower St. Croix and lower Red Cedar River (Figure 20).

Figure 20: Mean Length at Age Walleye-May 2000 lower Red Cedar River and lower St. Croix River.



From this information it appears that Walleye growth rates for ages 1 through 5 are comparable to the St. Croix River in western Wisconsin. Walleye growth rates for fish between ages 5 and 8 should be used carefully due to a small sample size for both the lower St. Croix and the lower Red Cedar River.   It should also be noted for both river systems, male walleye were the predominate sex aged during the May-00 sample. During our sampling events males were still actively expelling milt. We were unable to sex any female walleye during the May sample. Female walleye likely spawned during mid-April and therefore were not unidentifiable during our sampling period.

Table 4: Mean length at age walleye, lower Red Cedar River-May 2000

Year Class	Age	# Aged	Mean Length	SD
1999	1	3	7.9	.61
1998	2	34	12.0	1.53
1997	3	9	13.7	.95
1996	4	14	15.2	.70
1995	5	3	17.6	1.11
1994	6	2	21.0	1.06
1993	7	3	21.3	1.67

Mortality Estimates

Mortality estimates were calculated for walleye during the May sampling period. Estimated mortality was 41% (r-squared .79) for ages 2 to 7.

Figure 21: Catch Curve; Walleye-May sample lower Red Cedar River, Ages 2 to 7

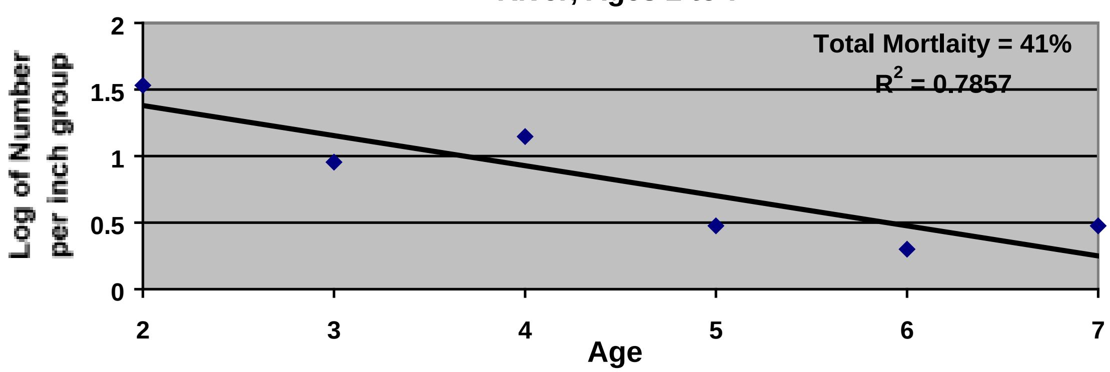


Table 5: Lower Red Cedar River-Estimated Annual Mortality Rates-Walleye

Month	Year	Age Range	Annual Mortality	R-Squared
May	2000	2-7	41%	0.79
		3-7	34%	0.63
		4-7	40%	0.57

WALLEYE OVERALL

Walleye abundance is relatively low on the lower Red Cedar River. Sampling gear bias may not effectively target larger fish in deep slow habitats. Nevertheless, mortality estimates had fairly good correlation, which may indicate that sampling bias may not be an overall limiting factor. In general, most walleye are under the 15 inch minimum size limit. Week year classes from 1993-1996 may be limiting adult fish abundance.

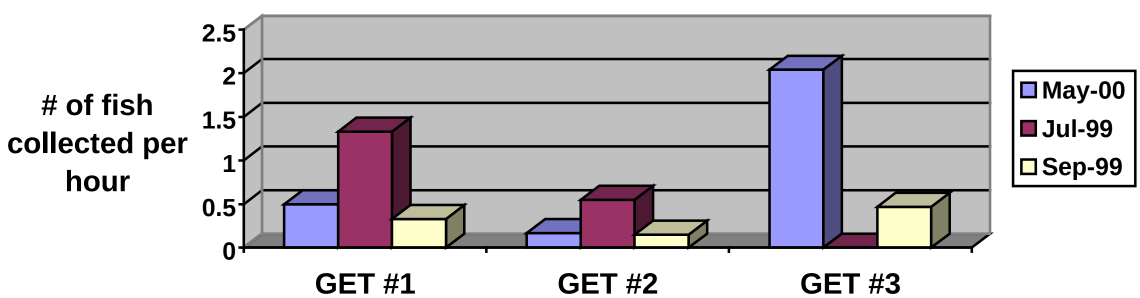
Without creel information it is difficult to determine what factors may be effecting walleye abundance. It is common knowledge that water temperature drives walleye recruitment and warm springs from 1997-2000 should help improve walleye abundance on the lower Red Cedar River. Walleye year classes from 1997 and 1998 appear to be strong and future annual trends monitoring on the lower Red Cedar River will provide needed information into walleye recruitment and what further management needs should be explored. In addition a creel census of the lower Red Cedar should be conducted to further evaluate angler harvest.

Another factor that should be taken into consideration is the effect of water level fluctuations during the springtime spawning and post-spawning period. Recent studies by (DiStefano and Hiebert 2000) documented that walleye behavior during spawning seasons was partially influenced by altered flow regimes and that reproduction might be enhanced if reservoir releases were continuous and of an appropriate magnitude during the spring spawning period. The upcoming re-licensing of the Red Cedar River project will be a timely opportunity to address these concerns.

SAUGER

Sauger catch rates varied by season and location (Figure 22). The September sample of sauger yielded the only legal sized sauger on the lower Red Cedar (Appendix A). No legal sized sauger were collected during the July-99 and May-00 sampling periods.

Figure 22: Sauger (CPUE/HR) All Sizes



Aging information was collected from thirty-two sauger during the September 1999 sampling period on the lower Red Cedar River (Figure 23). Most sauger are reaching the minimum size limit of 15 inches between ages 4 and 5. Growth rates for ages 4, 5, 6 and 7 were collected from a very small sample size (n=7) and therefore may not be representable of the entire sauger community on the lower Red Cedar River. Nevertheless it does provide general information and sauger growth rates on the lower Red Cedar River.

Figure 23: Mean Length at Age. Sauger lower Red Cedar River

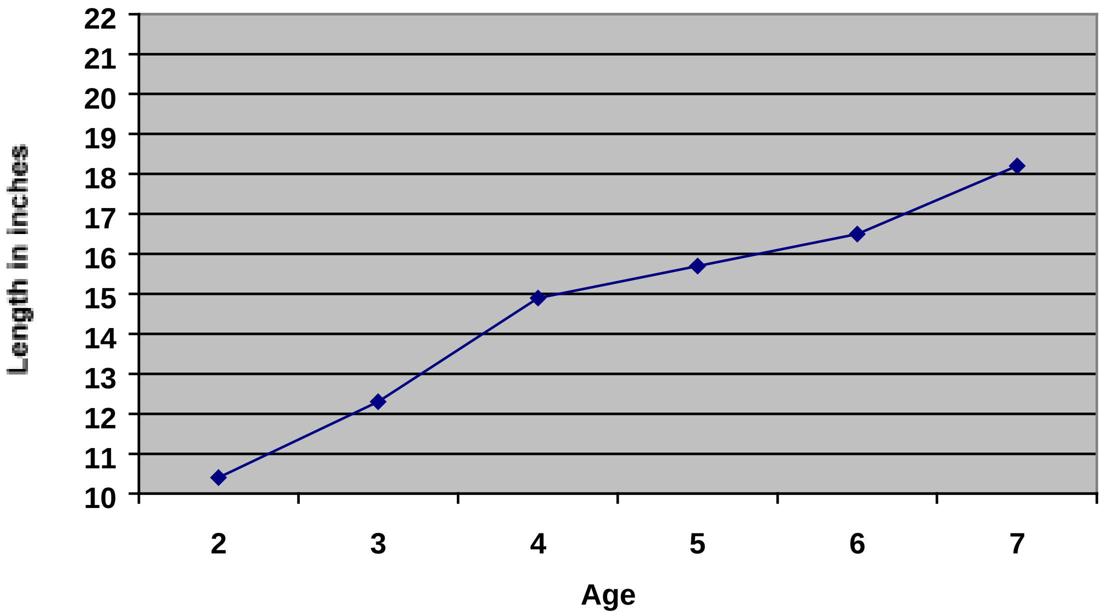


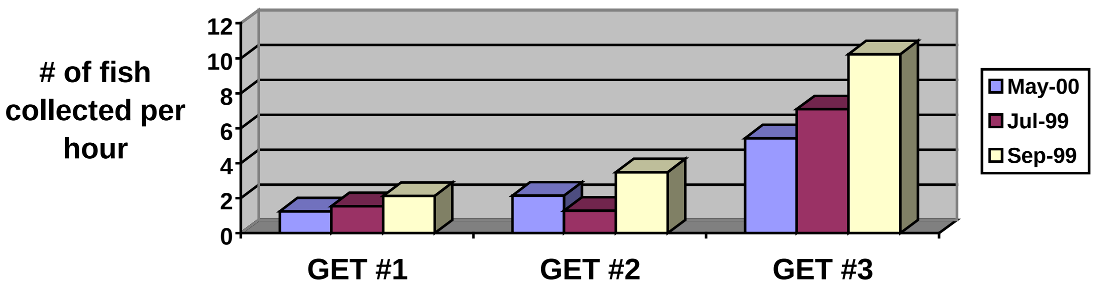
Table 6: Mean length at age sauger, lower Red Cedar River-September 1999

Year Class	Age	# Aged	Mean Length	SD
1998	2	7	10.4	.53
1997	3	18	12.3	.65
1996	4	2	14.9	.35
1995	5	2	15.7	.14
1994	6	1	16.5	N/A
1993	7	2	18.2	0

CHANNEL CATFISH

Channel catfish catch rates were highest during all sampling events at GET station #3 (Figure 24). In addition, catch rates for channel catfish were highest at all stations during the September sampling event. This data possibly suggests that electrofishing is more

Figure 24: Channel Catfish (CPUE/HR) All Sizes



effective during the fall for channel catfish. The data also appears to show a seasonal downstream movement, possibly to overwintering areas in the Chippewa or Mississippi Rivers. This is consistent with a recent study conducted by the Wisconsin DNR on the Lower Wisconsin River (Fago 1999) (Pellet, 1999). These studies documented that channel catfish occupy a relatively small home range during the summer, migrate downstream to the upper Mississippi River in autumn, then migrated back up the Wisconsin River in late spring to spawn and then occupied the same summer home ranges they had the previous summer.

STURGEON

Lake Sturgeon

Sampling of the lower Red Cedar River during all three sampling periods yielded no lake sturgeon. Unconfirmed reports of lake sturgeon have been recently documented by anglers as well as dam operators near the dam in Menomonie (Engel, Olson personnel communication).

Shovelnose Sturgeon

One shovelnose sturgeon was collected in the September 1999 sampling bout at GET station #2. No other shovelnose sturgeon were collected during the sampling events. Historically shovelnose sturgeon have been very abundant in this reach of the lower Red Cedar River. A study that was conducted in 1963 by Wisconsin DNR staff (Christenson, 1974) documented a total of 102 shovelnose sturgeon from Downsville to the mouth of the Chippewa River all in two day sampling bout from July 2-3, 1963. Of the 102 fish collected, 92 shovelnose sturgeon were captured in our present day sampling GET station #2 and 10 shovelnose sturgeon were captured in our present day sampling GET station #3. During the July 1999 sampling bout on the Red Cedar River, no shovelnose sturgeon were collected. This decrease in abundance is very alarming. The survey in 1963 documented that shovelnose sturgeon were the most common gamefish on the lower Red

Cedar River and this survey, some 40 years later, documented only one shovelnose sturgeon during the same seasonal sampling period.

Possible reasons for low catch rates may be attributed to sampling techniques. In the 1963 survey AC electrofishing was used as the gear type. In the 1999-2000 sampling event pulsed DC was used instead of AC. In researching historic records it appears that many of the fish were collected in water between 2-4 feet, usually in run type habitat. If this is the case, the pulsed DC sampling technique should have been effective in this depth range. In addition, the few fish that have been captured in the lower Red Cedar and in the lower Chippewa River were effectively drawn up into the field using pulsed DC, therefore it is unlikely that the change in sampling techniques could be influencing the lower catch rate in the 1999 and 2000 sample.

Another factor that should be taken into consideration is fish migration out of the Mississippi River. Since dam construction in the 30's and 40' historic fish migrations from the Mississippi may have been blocked during the construction of the Lock and Dam system. In 1999 and 2000 low water levels on the Mississippi and early spring run-off may have not allowed fish access above lock and dam #4 at Alma (Benjamin, personnel communication). In addition, in the past two years large numbers of shovelnose sturgeon have been captured by anglers below lock and dam #4 (Benjamin personal communication). Survey work done in 1963 documented a healthy population of older adult fish, with younger year classes very poor or either the sampling gear at the time as not effective at capturing fish under 20 inches (Christensen, 1974). If seasonal movement information existed and it could be shown that fish residing in the lower Chippewa or lower Red Cedar make seasonal movements to overwintering habitat in the Mississippi River, this may help focus management objectives for future recovery efforts.

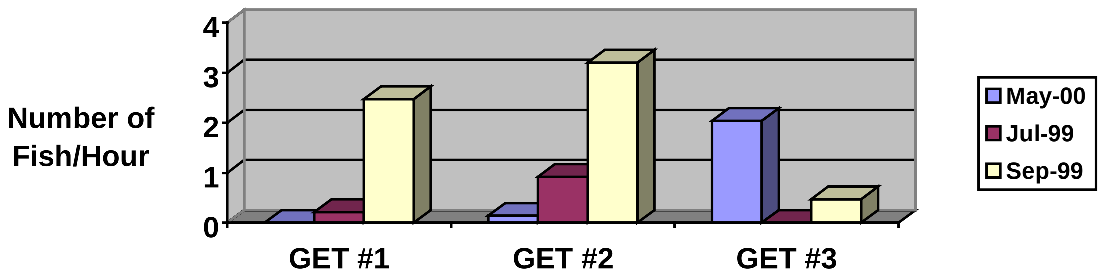
Additional research can provide insight into which factors may be attributing to the decline in shovelnose abundance and whether or not further investigations are needed to possibly promote year round passage on the Upper Mississippi so fish can access the lower Chippewa and lower Red Cedar Rivers.

WDNR fisheries staff measuring a shovelnose sturgeon

NORTHERN PIKE

Catch per unit of effort for northern pike varied greatly by season (Figure 25). For instance in the May sampling period catch rates at GET station #1 and GET station #2 were very low, but at GET station #3 catch rates were much higher. In the fall the exact opposite occurred. Catch rates were much higher at GET station #1 and GET station #2

Figure 25: Northern Pike Catch Rates-Lower Red Cedar River



and considerably lower at GET station #3. It should be noted that electrofishing for northern pike is not the preferred sampling gear and is highly gear biased. However it provided enough fish for this survey to develop some general age and growth information.

Northern Pike collected in the September 1999 sample were aged (Table 7). Overall, growth rates on the lower Red Cedar are above the statewide average. The sample size used to make this comparison was small, so this information should be used cautiously. In addition, male and female northern pike can have substantial variability in growth rates between the two sexes. Since the sample size was so small, depending on which sex was more prevalent in older year classes could easily influence the ageing data. A good example of this is in the 8-9 year fish. A smaller sample size of nine year old fish (which were likely males) were slower growing then the larger sample size of eight year old fish (likely females). Nevertheless, this information does provide some insight into the northern pike population in the lower Red Cedar River and overall it appears to have better than average growth rates, with numerous fish larger than 26 inches, which represented 29% of the total northern pike September catch.

Table 7: Northern Pike Mean Length at Age, lower Red Cedar River.

Year Class	Age	# Aged	Mean Length	SD
1999	1	13	11.5	1.20
1998	2	6	17.0	1.19
1997	3	5	19.5	.62
1996	4	6	23.6	.95
1995	5	5	27.1	.50
1994	6	1	27.8	N/A
1993	7	0	-----	
1992	8	4	31.1	3.03
1991	9	2	28.8	.07

MUSKELLUNGE

During all three sampling bouts only one muskellunge was collected at GET station #2. It appears from this survey that the muskellunge population or fishery is likely a very minor part of the lower Red Cedar River sportfish community and is probably not heavily targeted by anglers.

SALMONIDS

Although the lower Red Cedar River is a warmwater sportfishery, it is not uncommon to have salmonids occupying larger rivers on a seasonal basis. Similar movements have been documented on the Oconto and Wolf Rivers in northeastern Wisconsin (Avery, personnel communication, WDNR unpublished data). Brown and brook trout were collected during this survey from the lower Red Cedar River. Abundance of trout species was common throughout the mainstem of the lower Red Cedar the May sampling season, absent in the July sample and present in the September sampling bout. This data suggests that salmonids likely use portions of the lower Red Cedar River for overwintering habitat considering the large number collected in the May sampling period. This can be further confirmed since catch rates of brook trout were the third highest gamefish collected during the May sampling bout at GET station #1.

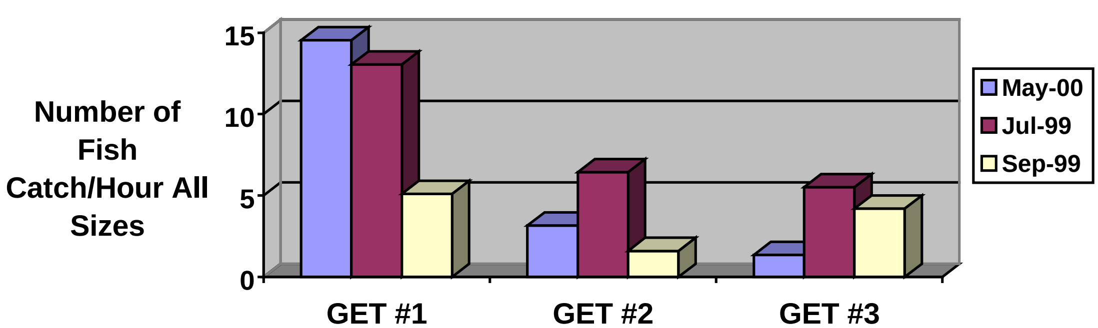
It is likely that the large number of brook trout are from two small tributary streams Irving Creek and Little Elk Creek which empty into the lower Red Cedar River in GET station #1. Brown trout are likely filtering down from Gilbert Creek which is stocked with brown trout in its lower reaches (Engel, 1997).

ENDANGERED AND THREATENDED SPECIES

Blue Sucker

Blue sucker were the most abundant species collected that is listed as threatened or endangered under Wisconsin law. Blue sucker were moderately abundant throughout the 17.5 miles of the lower Red Cedar River and it appears that the current population is secure in the lower Red Cedar River. Blue sucker were frequently captured in deep-fast type habitat throughout the lower Red Cedar, usually at the tail end of a pool and at the

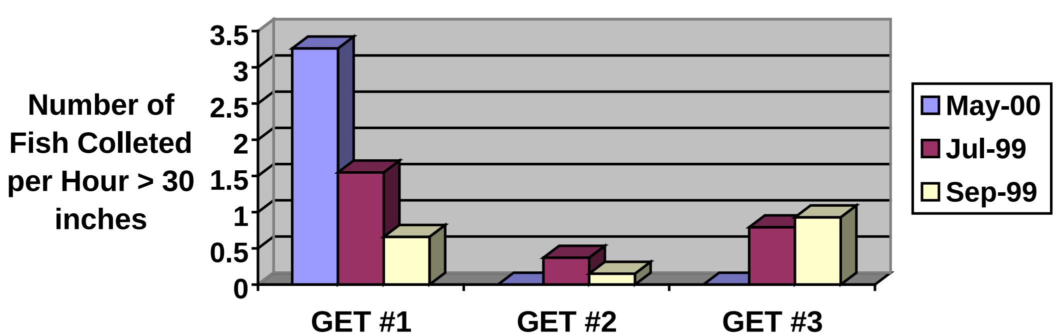
Figure 26: Blue Sucker (CPUE/HR) All Sizes



upstream end of larger riffle-run type habitat, in water of 2-4 feet deep. It should also be noted that blue sucker were also captured in fair numbers in deep-slow habitats near in-river cover.

Catch rates for blue sucker varied by site and also on a seasonal basis (Figure 26). Catch rates at GET station #1 were highest during all three seasonal sampling periods and substantially higher during the May and July sampling period. During the May sampling period male and female blue suckers were collected in spawning conditions on May 10, 2000, when water temperature was measured at 63 degrees Fahrenheit. In addition, it appears that during the May sampling period a spring spawning run occurs on the lower Red Cedar. This is evident because catch rates dropped off considerably downstream of GET station #1 during the May sampling period. The data also shows that large adult blue sucker greater than 30 inches were only collected at GET station #1 during the May sampling period (Figure 25). In contrast blue sucker > 30 inches were collected throughout the entire lower Red Cedar River during the July and September sampling periods. This is consistent with work that was done on the lower Chippewa River (EA, 1998) during the re-licensing of the Dells Hydro dam. Blue sucker were collected immediately below the Dells Dam on the Chippewa River during the months of April and May, but were not collected in the same study reach during July and September.

Figure 27: Blue Sucker (CPUE/HR) > 30 inches



A small survey was conducted (Christenson, 1974) on the lower Red Cedar River documenting basic population parameters (length frequency in 1963 and weight ranges in 1972) on the blue sucker. A length frequency comparison between the 1963 sample and the 1999 and 2000 sample is presented in (Figure 28 and Table 8). Effort was not recorded in the 1963 sample, and AC electrofishing was the gear type, so it is impossible to compare catch per hour information. It can be reasonably concluded though in general that the size distribution is much more diverse in 1999-2000 than it was in the 1963 sample and that mean weight seems to have improved between the 1972 and 1999-2000 samples (Table 9).

Figure 28: Blue Sucker Length Distribution on the Lower Red Cedar River

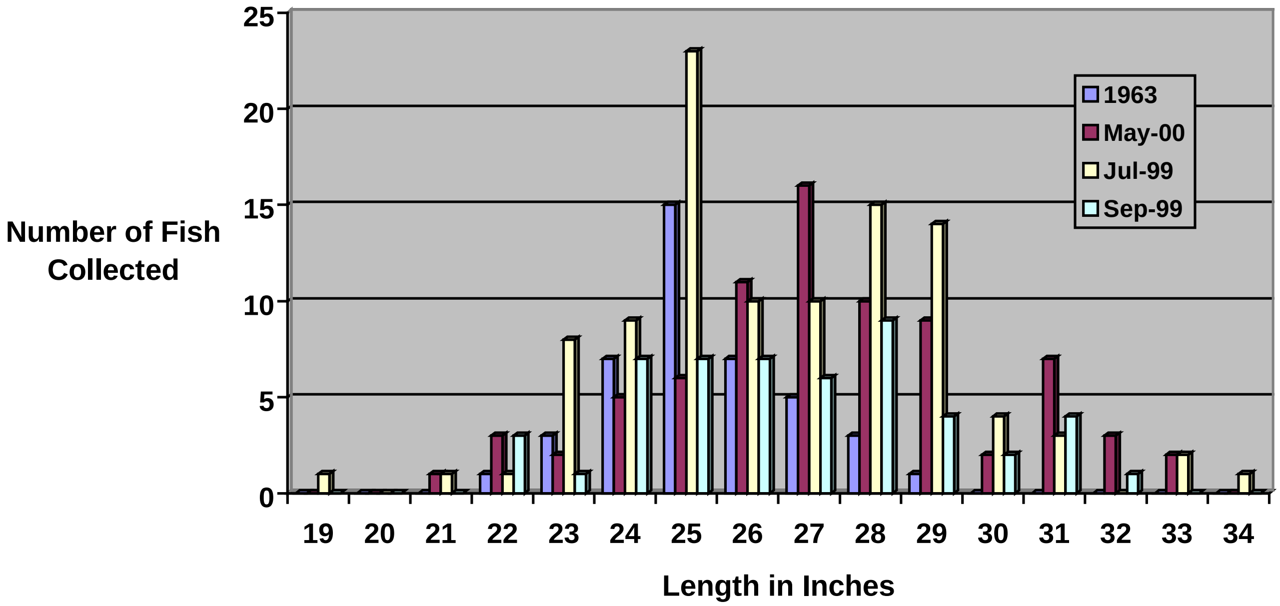


Table 8: Length Frequency Comparison-Blue sucker, lower Red Cedar River. 1963 vs. 1999-2000 samples.

Inch Group	1963	May-00	July-99	Sept-99	Inch Group	1963	May-00	Jul-99	Sept-99
18.0-18.9	0	0	0	0	27.0-27.9	5	16	10	6
19.0-19.9	0	0	1	0	28.0-28.9	3	10	15	9
20.0-20.9	0	0	0	0	29.0-29.9	1	9	14	4
21.0-21.9	0	1	1	0	30.0-30.9	0	2	4	2
22.0-22.9	1	3	1	3	31.0-31.9	0	7	3	4
23.0-23.9	3	2	8	1	32.0-32.9	0	3	0	1
24.0-24.9	7	5	9	7	33.0-33.9	0	2	2	0
25.0-25.9	15	6	23	7	34.0-34.9	0	0	1	0
26.0-26.9	7	11	10	7	35.0-35.9	0	0	0	0

Table 9: Weight Ranges Comparison-Blue sucker, lower Red Cedar River. 1972 vs. 1999-2000 samples.

	July-1972		July-1999	
Inch Group	N	Mean Weight	N	Mean Weight
19.0-19.9			1	1.5
20.0-20.0				
21.0-21.9	1	2.8	1	3.7
22.0-22.9	0	N/A	1	3.3
23.0-23.9	2	4.1	8	3.9
24.0-24.9	3	4.7	9	4.5
25.0-25.9	6	5.5	23	5.7
26.0-26.9	3	5.8	10	6.3
27.0-27.9	1	6.8	10	6.9
28.0-28.9	3	7.5	15	8.2
29.0-29.9			14	8.8
30.0-30.9			4	11.3
31.0-31.9			3	12.6
32.0-32.9				
33.0-33.9			2	14.6
34.0-34.9			1	14.8

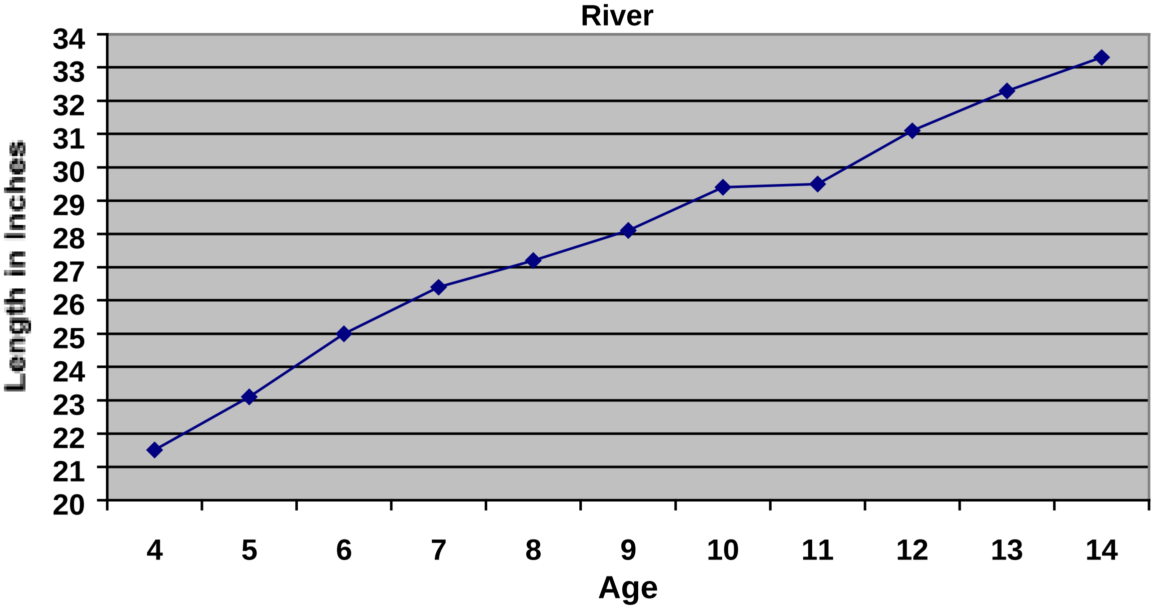
Age and Growth

Scales were collected and fifty-eight blue sucker were aged during the May 2000 sample (Figure 29 and Table 10). The smallest individual that was aged was 21.5 inches in length and estimated at four years of age and two larger individuals, which were in excess of 33 inches in length, were estimated to be 14 years old.

Table10: Mean Length at Age Blue Sucker, lower Red Cedar River-May 2000

Age	# Aged	Mean Length	SD
4	1	21.5	n/a
5	4	23.1	.96
6	6	25.0	.48
7	5	26.4	.65
8	5	27.2	.76
9	9	28.1	.45
10	7	29.4	.15
11	7	29.5	.47
12	9	31.1	.47
13	3	32.3	.06
14	2	33.3	.21

Figure 29: Blue Sucker Age and Growth-May 2000 lower Red Cedar River



Blue Sucker Overall

From this data it appears that the blue sucker population on the lower Red Cedar River has been improving. In 1963 there were no blue sucker over 30 inches recorded. In 1999 and 2000 there were fair numbers of blue sucker over 30 inches recorded. In addition, it appears that the average weight of blue suckers in 1999 compared to 1972 has increased (it should be noted that the 1972 sample was much smaller than the 1999 sample). Younger year classes of blue sucker were not present during our sampling events. Staff from the Long Term Resources Monitoring team on the Mississippi River have reported young-of the year blue sucker in main channel border habitat on the Mississippi River (Bartels, personal communication). Efforts to document blue sucker juvenile habitat selection and movement should be pursued.

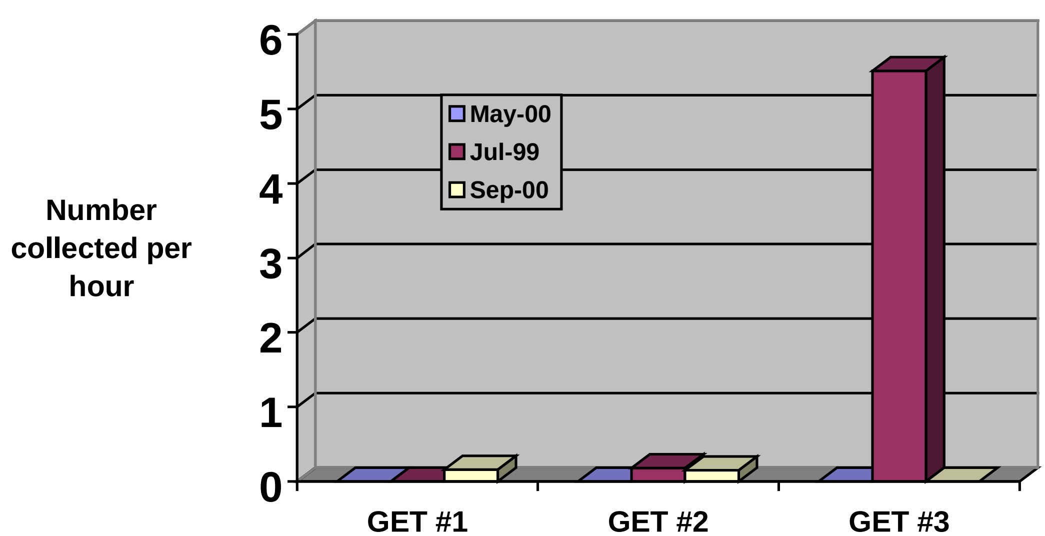
Greater and River Redhorse

Greater and river redhorse are listed as threatened species under Wisconsin law. Greater and river redhorse were collected during all sampling bouts on the lower Red Cedar River. Catch rates were combined because of potential identification errors during gamefish runs. Since identification errors were likely during the GET runs, catch per hour information from the gamefish runs will not be reported in this report. It is our opinion that the majority of redhorse captured were river redhorse, but both species were captured on the lower Red Cedar River.

Crystal Darter

The crystal darter is listed as an endangered species under Wisconsin Law. Crystal darter were documented in low numbers throughout the entire lower Red Cedar River (Figure 30). Crystal darter were collected over shoal areas in water of 1-3 feet deep, with the primary substrate consisting of medium to small gravel and sand. One crystal darter was collected near the sewage treatment plant outfall in Menomonie during the IBI sampling run in July of 1999. This is the first recorded specimen that far upstream on the Red Cedar River. The largest numbers of crystal darter were captured at GET station # 3 on the lower Red Cedar River, during the July sample. Catch per unit effort data concerning crystal darter should be judged very cautiously, due their small size and possible gear bias. Nevertheless it appears that species presence and/or absence can be obtained by electrofshing during gamefish runs.

Figure 30: Crystal Darter (CPUE/HR) All Sizes



WDNR fisheries staff with a crystal darter near Dunnville, lower Red Cedar River.

Endangered and Threatened Species Overall

From the survey information that was collected, blue sucker are consider moderately abundant. River redhorse occurrence is common, greater redhorse, abundance is considered low. Crystal darter are present, but their abundance is considered low throughout the lower Red Cedar River. One black buffalo was collected in May outside of GET station #2 in IBI station #2. This is the first recorded black buffalo in the lower Red Cedar or lower Chippewa River Basin. Its presence is the lower Red Cedar River is consider extremely rare.

Future management of all endangered and threatened species should be considered a high priority for the Department. There are probably few places in the Upper Midwest, where fish species diversity and relative abundance is higher. Many of the species in the lower Red Cedar represent some of the last remaining strongholds for large river fishes in the Upper Midwest. Protection, maintenance and restoration of aquatic habitat and water quality conditions on the lower Red Cedar River is of utmost importance.

Management Recommendations

1. **Habitat Protection**: Protecting and maintaining aquatic habitat conditions should be a high priority for the Department within the lower Red Cedar River corridor. Protection should consist of fee-title acquisition or easement acquisition of riparian lands along the lower Red Cedar River corridor through the lower Chippewa State River Natural Area. Protection of this corridor would protect critical near shore-habitat, minimize bank disturbance and development and add to the scenic beauty of the lower Red Cedar River. In addition, the Department should fully participate in the FERC re-licensing efforts for the lower Red Cedar River hydropower projects in efforts to avoid and minimize habitat losses from water level fluctuations caused by hydropower peaking operations. The Department should also work with Dunn County in efforts to protect near shore habitat. These management recommendations are consistent with the lower Chippewa River Basin State of the Basin Report.

2. **Trends Monitoring**: The Department should continue long-term trends monitoring on the lower Red Cedar fish community. Trend information will allow local management staff to determine if the native fish community is stable, improving or decreasing through time following the nonwadeable baseline monitoring protocol.

3. **Life History Information:** The Department should develop species specific management projects in efforts to collect life history information on important fisheries resources in the lower Red Cedar River. Acquisition of movement information, spawning requirements, etc. for select endangered and threatened species as well as possibly select gamefish and non-gamefish communities is needed. In addition, a comprehensive investigation should begin immediately to assess the possible decline in the shovelnose sturgeon fishery.

4. **Warmwater Habitat Restoration:** Fisheries staff should consider developing warmwater habitat improvement projects and/or restoration projects on the lower Red Cedar River. Such projects could consist of spot-treatment bank stabilization, boulder clusters, woody-debris/snag incorporation, connection of backwater oxbows or restoration of native shoreline plant communities.

5. **Creel Census Survey:** The Department should develop and implement a creel census on the lower Red Cedar River by 2005. No creel information exists and it would be advantageous to document angling pressure, harvest, effort and possibly any adverse effects from a year round angling season. This recommendation is consistent with the Fish and Wildlife Plan of Wisconsin.

6. **Red Cedar River Trail:** Fisheries staff should work with WDNR trails and parks, lands and natural area staff in efforts to promote and manage the lower Red Cedar River Corridor as a wild river, with emphasis on protecting habitat for aquatic and terrestrial life as well as, aesthetic scenic beauty.

7. **Regulation Evaluation and Year Round Angling Season Impacts:** The Department should seek public input in relationship to the current angling regulations on the lower Red Cedar River. This is consistent with the WDNR Walleye Management Plan and the lower Chippewa River Basin State of the Basin Report.

8. **Fish Passage Opportunities:** The Department should consider seeking fish passage opportunities at the Menomonie and Cedar Falls dams. If fish passage were provided many species that are currently found downstream of the Menomonie dam, but not above the Cedar Falls dam, could be allowed access to more than 50 miles of large free-flowing riverine habitat. These opportunities should be explored during the FERC re-licensing process.

9. **Dam Construction:** The Department should not allow any new dams to be constructed on the lower 17.5 miles of the lower Red Cedar River. This free-flowing large riverine habitat represents some of the rarest fish communities in the Upper Midwest. If dams were to be constructed on the lower Red Cedar River, those native fish communities would likely be lost.

10. **Future Fish Stocking Practices:** The Department should not stock or permit any stocking of gamefish species on the lower Red Cedar River. Currently, native fish communities are providing and maintaining a desirable large river fishery. In certain circumstances, recovery stocking for species such as, but not limited to shovelnose sturgeon may be needed at some point if deemed appropriate.

11. **Water Quality:** The Department should promote management strategies than target improving water quality conditions in the lower Red Cedar River.

Acknowledgments:

I would like to personally thank Marty Engel for his substantial input in regards to project writing as well as, his assistance on this survey and technical report review. Brian Spangler and Dean Johnson deserve much credit for the long-hours spent on surveys, processing fish and equipment maintenance. Brian Michalek was responsible for bringing the final draft together and assisting with the data analysis. I would like to thank my supervisors John Paddock and Jim Holzer for their support and team members who participated in the survey from the lower Chippewa, the Mississippi GMU's as well as staff from the SCR, NOR, SER and Central Office.

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